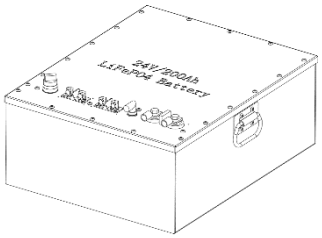
Instruction Manual

LiFePO4 Battery Packs

24V/200Ah Series:

IP50 battery pack equipped with a smart battery management system (BMS) to ensure stable and highly efficient charge and discharge performance. It can be charged by a lithium-based battery charger. LiFePO4 is one of the safest Li-ions, recognized with the outstanding electrochemical performance and endurability.



Safety Rules and General Warnings

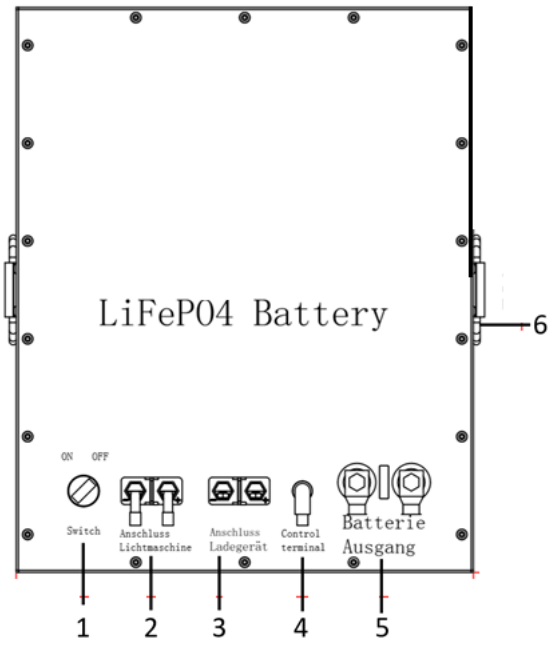
- Persons, who are not able to use the battery pack in a safe way, because of their physical, sensory or mental incompetence, or because of their lack of experience, should not use without the control or instruction from a skilled or qualified person.
- The battery pack is not suitable for children – Danger of Life. And beware of risk of electric shock at all time.
- Avoid flammable gases, solvents or vapours all the time. Ensure sufficient air and prevent open flame or sparks. Never incinerate the battery pack. Explosion RISK!
- Follow strictly the charging and discharging instructions and use only chargers of appropriate specificaitons / charge profiles to charge the battery pack.
- Make sure the screws at the charge / discharge terminals are always tightened. Screw drivers used for tightening the screws must be well electrically insulated.
- DO NOT OPEN or DISMANTLE the battery pack. Repair work or cell replacement must only be processed by authorized technical staff.
- Disassembling the battery pack may cause short circuit within the cells, which may further lead to fire, release of harmful gases, electrolyte leakage or even explosion.
- In case of any obvious damages such as deformed enclosure, electrolyte leakage or the presence of any unpleasant smell, the battery pack must not be used. Disconnect from the charger or application immediately.
- DO NOT TOUCH the electrolyte. It is harmful. If the electrolyte splashes into your eyes or on your skin, flush your eyes or skin with cold water immediately and consult the doctor.
- The battery pack should be protected against direct sun light, solar radiation or temperatures over 40°C.
- Keep the battery pack in dry room (rel. humidity <80%). Clean with dry cloth only. Avoid fluid of any kind to get into the battery pack.

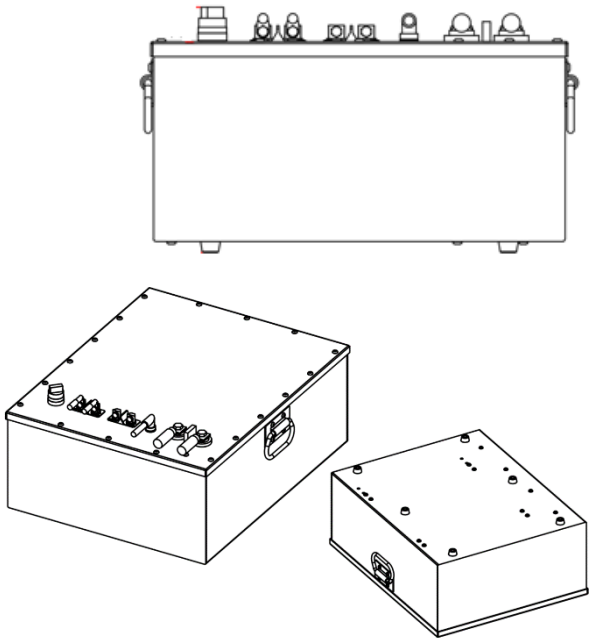
Special Features

- Passive cooling and galvanized iron sheet enclosure
- Auto heating mechanism at low temperature (at certain pre-set temperature)
- Specially designed protective circuit to prevent the battery pack from over-charge or over-discharge
- Automatic shut-off at unsafe temperatures
- LED indicators or buzzer giving alarm at certain pre-set state of charge

Product Configuration

1. BMS on/off Switch	**2. Generator Charge Terminal**	**3. Charger Charge Terminal**
4. Communication Port	**5. Discharge Terminal**	**6. Handle**





Pb-free RoHS conform

Mainland Energy Conversion Ltd.
Tel: +852 2366 9610
E-mail: mec@mec-mainland.com
www.mec-powersolutions.com

Preparation – Before Charging or Discharging

General Checking
- Check thoroughly including all the cables for showing no damages
-

Polarity Checking
WARNING: Check the polarity before connecting to the charger or the load

DC Mains Supply Checking
- Make sure the DC cable must not be cut, shortened or extended under any circumstances
- Make sure the mains supply complies with the technical specification requirements of the charger and the battery pack

Charging the Battery Pack

Connecting the Charger to the Battery Pack
- Make sure the mains supply and the charge profiles of the charger comply with the specifications of the battery pack
- Switch off the charger and connect it to the battery pack
- If this is the first charging of the battery pack, please switch the BMS to “ON” mode and wait for 10 seconds. The BMS collects the system data and makes the battery pack ready for charge. Immediate charging of battery pack after switching on may damage the circuit.
- Connect the charger to mains supply and switch on the charger

Charging the Battery Pack
- Low temperature Charge Method: 0.1C (i.e. 20A) Constant Current Charging @0 ºC to 10ºC
- Standard Charge Method: 0.2C (i.e. 40A) Constant Current Charging
- Maximum Charge Current: 0.5C (i.e. 100A)

Charging Advice
The working environment of the battery pack may affect the charging performance. The optimum charging condition is from 0°C to 45°C and 60±25% relative humidity. You are advised to ensure a suitable working environment for the battery pack. Otherwise, the charging efficiency, battery capacity and battery lifetime may be affected.

Discharging the Battery Pack

Before Discharging
- Make sure that load / device is switched off
- Connect the battery pack to load / device
- If this is the first discharging of the battery pack, please switch the BMS to “ON” mode and wait for 10 seconds. The BMS collects the system data and makes the battery pack ready for discharge. Immediate discharging of battery pack after switching on may damage the circuit.
- Switch on the load / device

Discharging the Battery Pack
- Standard Discharge Method: 0.5C (i.e. 100A) Constant Current Discharging
- Maximum Discharge Current: 1C (i.e. 200A)

Discharging Advice
The working environment of the battery pack may affect the charging performance. The optimum charging condition is from 0°C to 60°C and 60±25% relative humidity. You are advised to ensure a suitable working environment for the battery pack. Otherwise, the charging efficiency, battery capacity and battery lifetime may be affected.

Storage and Caring of the Battery Pack

Battery Storage:

As there are chemical reactions within the cells, the battery performance deteriorates over time and this is absolutely normal. If storage is required, the battery pack should be charged to 50% state of charge (SOC) for storage. Under different storage conditions, the recommended charging period is varied:

- The battery pack should be charged and discharged fully once every 3-month for maintenance.
- Under -20°C to 25°C: Charge to 50% SOC and the battery pack can be kept for 3 months
- Under -20°C to 45°C: Charge to 50% SOC and the battery pack can be kept for 1 month

Storing the battery pack under extreme conditions speeds up the degradation of the cells within. In long run, this would greatly reduce the battery capacity and lifetime.

Battery Care:

- Never expose the battery to high temperatures, as this causes permanent battery capacity loss.
- Never deep-discharge or overcharge the battery, cells can be damaged irreversibly.
- If possible, always disconnect the battery from the load when being stored over long period of time.
- Store battery in a dry and cool place at about 40-60% of its rated capacity.

Mainland Energy Conversion Ltd.
Tel: +852 2366 9610
E-mail: mec@mec-mainland.com
www.mec-powersolutions.com

Troubleshooting

In case the BMS goes into protection mode due to over-charge, over-discharge or unsafe operating temperatures, please switch off the battery and wait for 2 seconds. Then, switch the BMS to “ON” mode and wait for 10 seconds. Please make sure the unsafe conditions are cleared, then the procedure of restarting the BMS would make the battery pack ready for charging / discharging.

Advice for Disposal

It is strictly prohibited to dispose the battery as mixed municipal waste according to the Battery Directive 2002/96/EC. It must be disposed at the local collection points. To protect the environment, please contact the communal administrative agency regarding the nearest collection point. The battery pack follows the RoHS-directive EU 2015/863 for the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Disclaimer of Warranty

The warranty period (see our General Terms and Conditions) starts with the battery pack being dispatched by the manufacturer. The Company accepts liability by guaranteeing to working hours and spare parts only.

For damages caused by non-observance of the operating instructions, inappropriate start up or handling as well as dismantling, reconstructions or modifications of the battery pack, the warranty claim expires and the Company assumes no liability for consequential damages to any properties or persons in connection with or arising from the purchase and use of the battery pack.

We reserves the rights to configure the battery pack as per actual needs and the manual may not reflect the most updated conditions of the product at all times. Please contact us should you need any technological support.

Technical Specifications

Specifications	
Model	24V/200Ah LiFePO4 Battery
Cell Chemistry	3.2V/100Ah LiFePO4 Cells
Cell Configuration	8S2P
Rated Capacity (Ah)	200Ah @0.2C Discharge Rate
Nominal Voltage (V)	25.6V
Rated Energy (kWh)	5.12kWh
Voltage Range (V)	20.0V – 28.8V
Ladezyklen | Cycle Life	>2000 cycles with 80% discharge depth at 25°C
Remaining Capacity (%) after 2,000 Charge / Discharge Cycles	≥80% of initial capacity
Charging	
Low Temperature Charge Current (A)	0.1C/20A @0 °C to 10°C (Constant Current Charging)
Standard Charge Current (A)	0.2C/40A (Constant Current Charging)
Maximum Charge Current (A)	0.5C/100A (Constant Current Charging)
Charge Condition	@0°C to 45°C
Discharging	
Standard Discharge Current (A)	0.5C/100A (Constant Current Discharge)
Max. Discharge Current (A)	1C/200A (Constant Current Discharge)
Discharge Condition	@-10°C to 60°C
Battery Management & Communication	
Battery Management	Battery Management System with cell balancing and CAN-Interface
Cell Monitoring	Data logging for cell performance, state of health or maintenance
Protection / Durability	
Heat Dissipation	Passive Cooling
Cell Balancing	Automatic (Passive)
Safety	Overcharge, over-discharge, over-current and unsafe operating temp. protection
Heating System (opt.)	Available upon request
Enclosure & Terminals	
Enclosure	2.0mm iron sheet, electro-plated and powder coated
IP Code	IP50
Dimensions & Weight	520x420x246mm / 60kg
Charge- and Discharging Terminals	Opened-ended screw terminals
Maintenance & Storage	
Maintenance	The battery pack should be charged and discharged fully once every 3-month.
Storage Condition @ -20 °C to 25°C	Can be kept for 3 months at 50% capacity
Storage Condition @ -20 °C to 45°C	Can be kept for 1 month at 50% capacity
Warranty & Certificates	
Warranty	3 Years

Mainland Energy Conversion Ltd.
Tel: +852 2366 9610
E-mail: mec@mec-mainland.com
www.mec-powersolutions.com

Battery Protection Parameters

Description	Value	Action
Single Cell Voltage Upper Limit Alarm	3.65V	Main relay open => Stop charging / discharging
Single Cell Voltage Lower Limit Alarm	2.5V	
Single Cell Voltage Difference Alarm	0.5V	
Total Voltage Upper Limit Alarm	29.2V	
Total Voltage Lower Limit Alarm	20.0V	
Charge / Discharge Temperature Upper Limit Alarm	60°C	
Charge / Discharge Temperature Lower Limit Alarm	-30°C	
Charge / Discharge Current Upper Limit Alarm	405A	

Customer Supports

HONG KONG, CHINA
Asia Pacific Sales and Customer Service

Tel: + 852 2366 9610
Email: mec@mec-mainland.com

VILLACH, AUSTRIA
European Sales Arm

General Enquiry
Tel: +43 (0) 4242 55100
Email: office@mec-energietechnik.at

Technical Consultation
Wilfried Steger
Tel: +43 (0) 4242 55100-27
Email: w.steger@mec-energietechnik.at

Subject to technical modifications. We assume no liability for misprints.